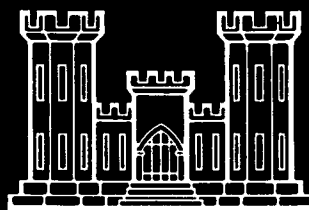




Process Design Manual

Land Treatment of Municipal Wastewater



U.S. ARMY
CORPS OF ENGINEERS



PROCESS DESIGN MANUAL
FOR
LAND TREATMENT OF
MUNICIPAL WASTEWATER

U. S. ENVIRONMENTAL PROTECTION AGENCY

U. S. ARMY CORPS OF ENGINEERS

U. S. DEPARTMENT OF INTERIOR

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I

This manual presents the state-of-the-art on process design for land treatment systems. It replaces the process design manual with the same title, published in October 1977. Preparation of this manual was sponsored by the U.S. Environmental Protection Agency (EPA), Office of Research and Development, and Office of Water; the U.S. Army Corps of Engineers; the U.S. Department of the Interior (USDI), Office of Water Research and Technology; and the U.S. Department of Agriculture (USDA), Office of Environmental Quality and Farmers Home Administration. An interagency coordinating committee representing these sponsors was established; this committee then selected a team of contract authors. Contract administration was provided by EPA CERL, Cincinnati, Ohio.

PROJECT OFFICER: Dr. James E. Smith Jr., EPA, CERL.

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CONTRACTOR: Metcalf & Eddy, Inc., Sacramento, California.

Supervision and Principal Authors:

Ronald W. Crites, Project Manager,
E.L. Meyer and R.G. Smith

Staff Authors:

M. Walker, K. Alston, M. Alpert, C. Stein

Editing and Review:

F. Burton, J. Miller, C. Pound

Consultant Authors:

Dr. A. Wallace, University of Idaho; Dr. W. Nutter, University of Georgia; Mr. D. Hinrichs, Culp/Wesner/Culp; Mr. B. Whitson, Mr. D. Deemer, Dr. O. Aly, and Mr. L. Gilde, Campbell Soup Company; Dr. E. Myers, Williams & Works, Inc.; Mr. D. Hirschbrunner and Ms. D. Parkes, Bruce Gilmore & Associates, Inc.

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II

A technical workgroup composed of members from the sponsoring agencies, as well as other invited experts, was formed. In addition, a multidisciplinary group of engineers and scientists also furnished technical review. Under the direction of its chairman, the workgroup defined the scope of the effort, supervised the work of the contractor, reviewed the manual, and provided technical editing and input to the manual.

CHAIRMAN: Sherwood C. Reed, USA CRREL

WORKGROUP:

EPA:	Mr. R.E. Thomas, Dr. J.E. Smith Jr., Dr. C. Harlin, Mr. W. Whittington, Mr. R. Bastian, Dr. H. Thacker, Dr. N. Kowal, Mr. R. Dean, Mr. J. Ariail, Dr. C. Enfield, Mr. J. Roesler, Mr. W. Huang, Mr. J. Smith
U.S. Army:	Mr. N. Urban, Mr. D. Lamont, Mr. W. Medding, Mr. P. Carmichael, Dr. I. Iskandar, Mr. J. Martel, Mr. J. Bouzoun, Dr. R. Lee, Mr. M. Cullinane, Mr. J. Bauer, Dr. S. Schaub, Dr. H. McKim
USDA:	Mr. P. Smith, Mr. C. Rose, Mr. G. Deal, Dr. H. Bouwer, Mr. W. Opfer, Dr. D. Urie, Mr. R. Phillips, Dr. D. Clapp
USDI:	Mr. R. Madancy
USDOE:	Ms. B. Broomfield
NSF:	Dr. E. Bryan

Academic Institutions and State Agencies:

Dr. M. Kirkham, Dr. E. Lennette, Dr. W. Sopper,
Dr. R. Smith, Dr. A. Overman, Dr. R. Abernathy,
Dr. M. Overcash, Dr. A. Erickson, Mr. D. Kendrick

Invited Technical Reviewers:

Mr. B. Seabrook, Mr. T. Jenkins, Mr. J. Kreissl,
Mr. A. Palazzo, Dr. E. Smith, Ms. H. Farquhar,
Dr. R. Lewis, Dr. T. Asano, Mr. T. Rothman,
Mr. R. Sletten, Mr. G. Abele

ABSTRACT

This manual presents a rational procedure for the design of land treatment systems. Slow rate, rapid infiltration, and overland flow processes for the treatment of municipal wastewaters are discussed in detail, and the design concepts and criteria are presented. A two-phased planning approach to site investigation and selection is also presented.

The manual includes examples of each process design. Information on field investigations is presented along with special considerations for small scale systems. Equations and procedures are included to allow calculations of energy requirements for land treatment systems. Potential health and environmental effects and corresponding mitigation measures are discussed.